INSTRUCTION MANUAL

DANGER

BERMUDA TRIANGLE
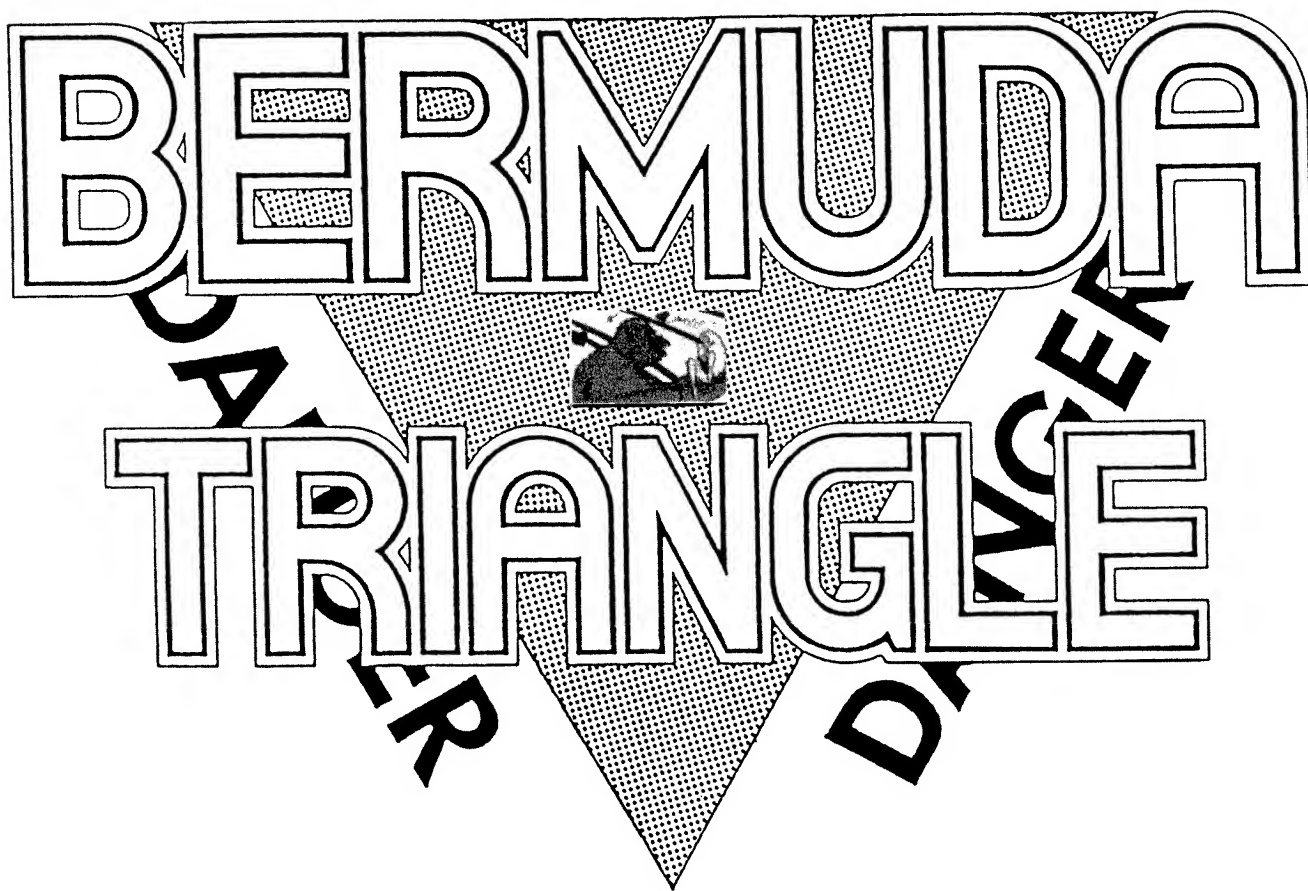
VERTICAL MONITOR CONVERSION KIT

TABLE OF CONTENTS

I. GAME PACKAGE CONTENTS

1 - Main Printed Circuit Board (PCB) Assembly
1 - PCB Shield (F.C.C. Compliance)
1 - SNK Wire Harness
1 - Joystick Assembly Package Includes:

    2 - Rotary Joysticks
    2 - Rotary Wire Harness Connectors
    1 - Knob Setting Tool (See Page 7)

1 - Marquee
1 - Control Panel Overlay
2 - Side Graphic Decals
1 - Monitor Card
6 - Control Buttons
1 - Instruction Manual

Inspect the entire contents of your game package to assure it is complete and in satisfactory condition. If any damages have occured during shipment, please notify your SNK distributor immediately.

II. WARNINGS AND NOTICES

F.C.C. WARNINGS:

The PCB shield supplied with this game package must be utilized and terminated to ground at the time of installation of the PCB. This is required in order to comply with the limits for a class A computing device persuant to subpart J of part 15 of F.C.C. rules. These rules are designed to provide reasonable protection against harmful interference to radio communications when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause RF interference in which case the user at his or her own expense will be required to take whatever measures necessary to correct the interference.

SNK recommends that the control panel be grounded and a grounded 3 wire outlet to be used for supplying power. These steps will assure a clear picture.

NOTICE:

Specifications and modifications may be changed without advance notice or warning.

DANGER:

DO NOT SOLDER control buttons or rotary joysticks or they will malfunction and the warranty will voided. Only use crimp lugs on all controls.

Whenever you change parts or insert/disconnect connector, always check to make sure power is off!

If your PCB is clearly found defective, please do not attempt to troubleshoot or check it with a tester, etc. The IC's may be destroyed by the voltage of a tester and your warranty will be voided.
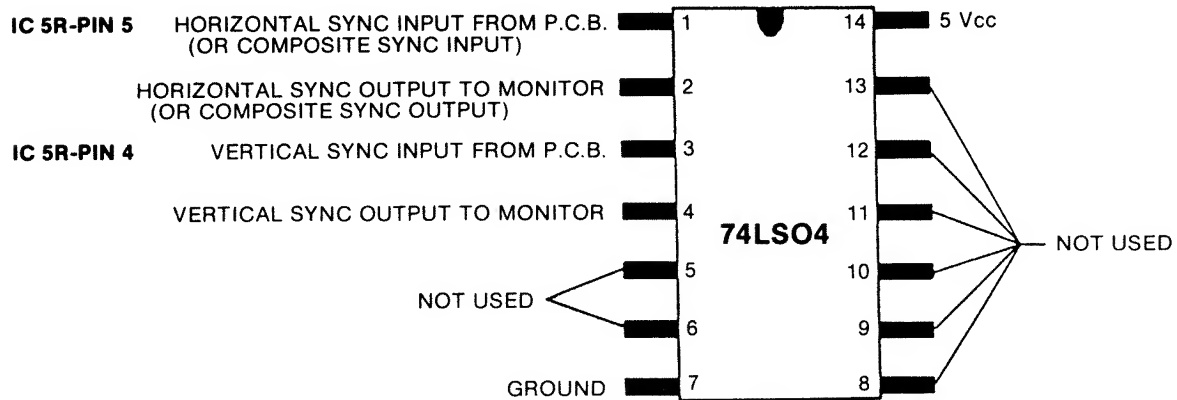
SNK recommends a **12 volt coin counter** be connected to the +12 volt line only. Do not use a +6 volt coin counter. A +6 volt coin counter will cause a voltage drop on the +5 volt line which could cause the game to function improperly or cause possible IC damage.

When handling monitor, stay clear of the High Voltage Sections.

III. REQUIREMENTS

A. MONITOR:

This game requires a **Vertically Mounted Raster Scan** type monitor with composite sync. If your monitor is one which requires separate or inverted syncs you may use the following illustration to conform to your monitor specifications.

IC 5R-PIN 5	HORIZONTAL SYNC INPUT FROM P.C.B. (OR COMPOSITE SYNC INPUT)	1 ─── 14 ─ 5 Vcc
	HORIZONTAL SYNC OUTPUT TO MONITOR (OR COMPOSITE SYNC OUTPUT)	2 ─── 13
IC 5R-PIN 4	VERTICAL SYNC INPUT FROM P.C.B.	3 ─── 12
	VERTICAL SYNC OUTPUT TO MONITOR	4 ─── 11
		5 ─── 10
NOT USED		6 ─── 9
	GROUND	7 ─── 8

74LSO4

NOT USED (pins 8, 9, 10, 11, 12, 13)

NOTE: Separate syncs may be found at the sync separator chip on the BOTTOM PCB IC # 5R 74LS86.

B. POWER SUPPLY:

SNK recommends the use of a switching type power supply with minimum current ratings as stated below:

Voltage	Current
+12 VDC	1 Amp
+ 5 VDC	8 Amps
- 5 VDC	1 Amp
Ground	

C. PCB SPECIFICATIONS:

Operating Requirements
    Voltage - +5.00 volts to 5.10 volts D.C., -5VDC, +12VDC.
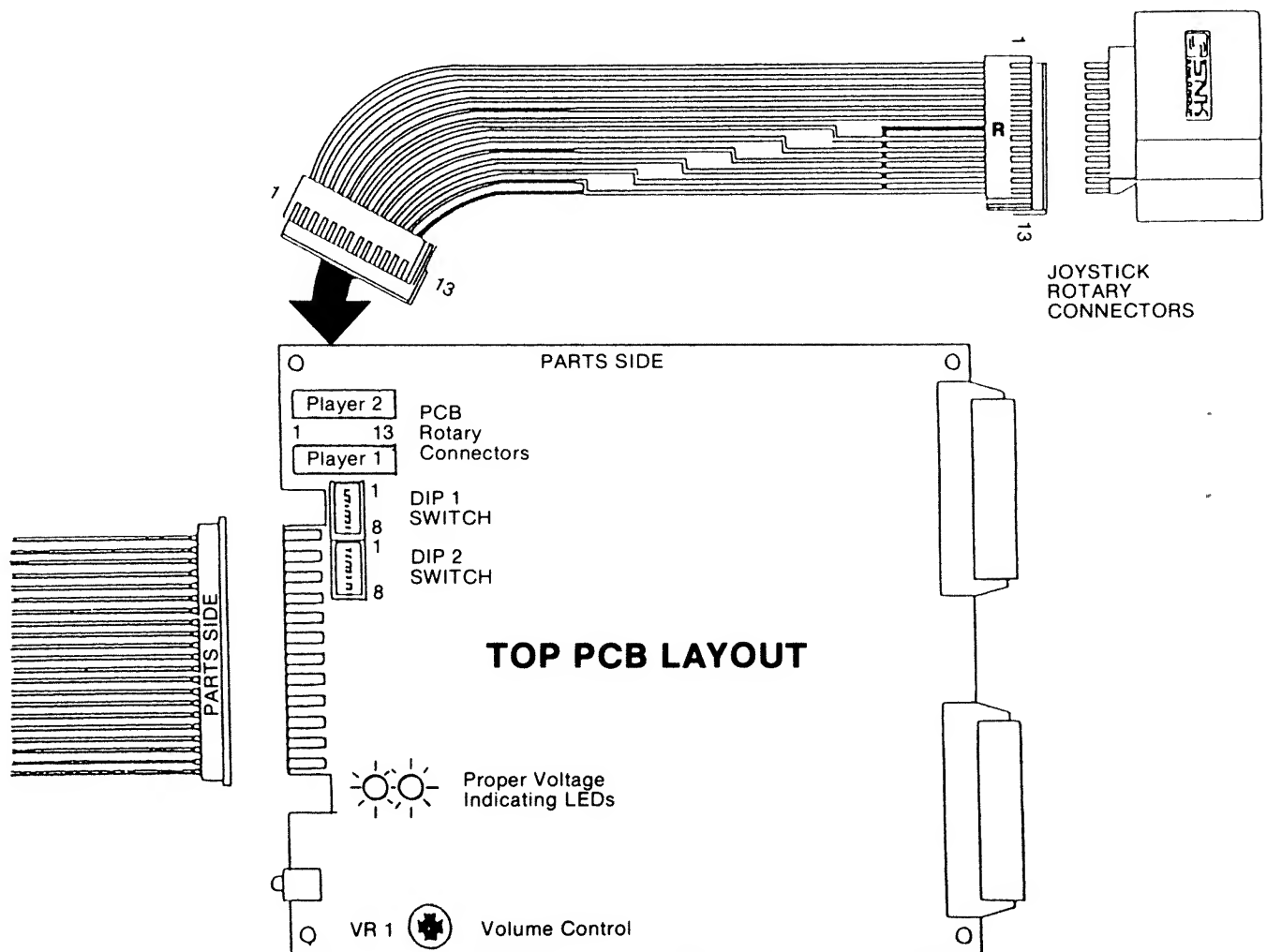   Amperage - 7.5 amps
    Power - 38.5 watts
    Temperature - 0° - 30°C or 32° - 100°F
    Humidity - 95% relative

The 5 volt supply draws about 7.5 amps on this PCB design and the power supply should be adjusted. When the voltage is correct, both LEDs will be lit. If only one LED is lit the 5 volt supply must be adjusted. Replace the power supply with one of a higher current rating if the voltage does not indicate 5 volts.

D. JOYSTICK ROTARY CONNECTIONS:

NOTE: "R"(Rotary) for proper direction of harness connection.

JOYSTICK
ROTARY
CONNECTORS

TOP PCB LAYOUT

PARTS SIDE

Player 2

1   13

Player 1

PCB
Rotary
Connectors

DIP 1
SWITCH

DIP 2
SWITCH

PARTS SIDE

Proper Voltage
Indicating LEDs

VR 1   Volume Control

IV. INSTALLATION PROCEDURES

A. PLACEMENT OF PCB:

Before mounting PCB, make certain that the wire harness has sufficient "slack/play" between both joystick rotary connectors and the PCB connections. (See Page #5) Mount all four corners of the PCB to assure stability. Allow room for the PCB shield away from the power supply section. Before mounting please check wire harness layout.

B. WIRE HARNESS LAYOUT:

Mark it, PARTS SIDE in order not to reverse connection which may cause damage to the PCB and/or power supply. Layout your wire harness from one and two player control panel to the PCB edge connector to assure that it is long enough. Remember that the voltage of an intermediate wire harness decreases by contact resistance, so please connect all of the wires provided for the supply voltages and grounds in order to assure sufficient voltage and to avoid contact burning on the PCB.

C. CONTROL PANEL CONFIGURATION
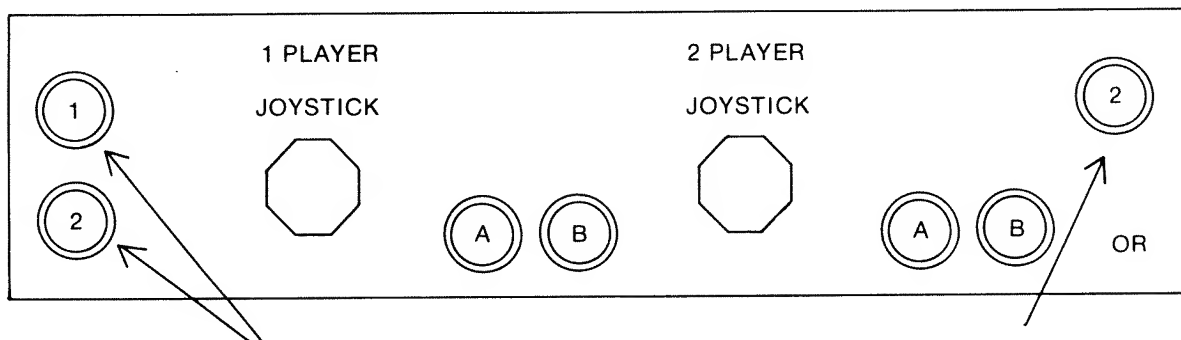
POSSIBLE 1 AND 2 PLAYER START CONTROL BUTTON LOCATIONS
Control Button A is for FIRE.   Control Button B is for GUARD FORMATION.
NOTE: DO NOT SOLDER CONTROLS.

D. POWER UP CHECKLIST

1. Make sure that the Main Wire Harness is wired properly to the Power Supply by measuring it with a volt meter.
2. Allow the Power Supply to discharge the voltage for about 10 seconds before connecting or disconnecting the edge connector.
3. Use crimp lugs on all CONTROLS and ROTARY JOYSTICKS and only solder other connections.
4. Ground all ground wires and the control panel.
5. Adjust the Power Supply and the Monitor.
6. Check all Controls and set the Dip Switches.
7. Secure the Main Wire Harness with wire ties.

E. LS30 - 24 JOYSTICK ASSEMBLY DIAGRAM
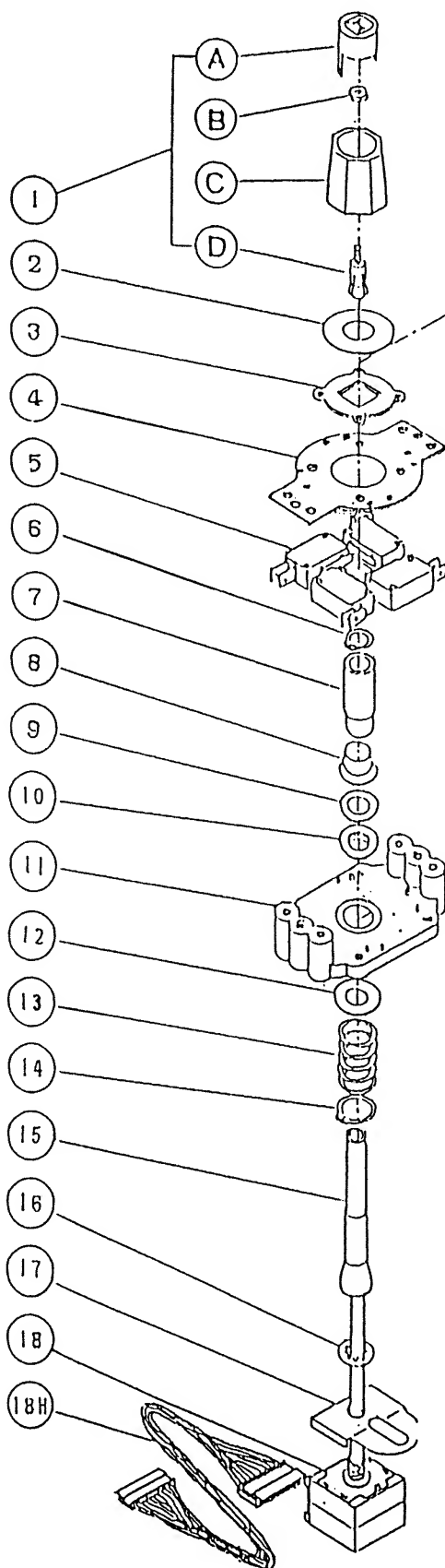
HOW TO REMOVE KNOB OF JOYSTICK ASSEMBLY.

1. Insert "fingers" of joystick tool under knob Make sure to align fingers with dots under knob. Push up to open top cap.
2. Use hex wrench to remove shaft nut.

Knob Setting Tool
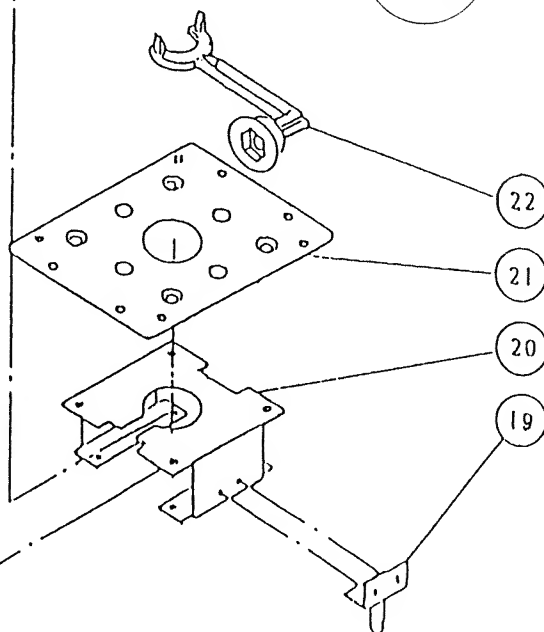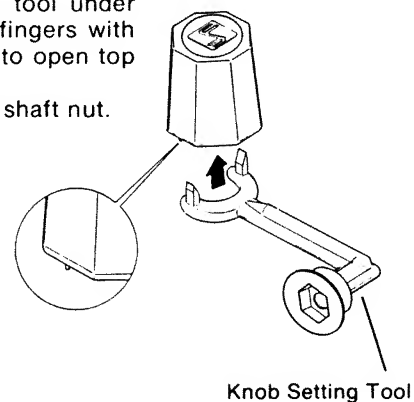
| PARTS NO.	PARTS NAME
LS30- 1	Knob
A	Cap
B	Knut (M6)
C	Knob (Main Body)
D	Fastener
LS30- 2	Lever mask
LS30- 3	Main guide
LS30- 4	Micro Switch Plate
LS30- 5	Micro Switch
LS30- 6	90 C-Clip
LS30- 7	Spacer (B)
LS30- 8	Spacer (A)
LS30- 9	Washer (small)
LS30-10	Shaft Holder
LS30-11	Shaft Holder Stand
LS30-12	Washer (large)
LS30-13	Spring
LS30-14	120 C-Clip
LS30-15	Shaft
LS30-16	Star Washer
LS30-17	Rotary Switch Installation Plate (SUS)
LS30-18	Rotary Switch
LS30-18H	Harness
LS30-19	Rotary Switch Stopper
LS30-20	Stand
LS30-21	Steel Base
LS30-22	Knob setting tool
LS30-24	Complete Assembly

V. DISPLAY TEST MODE

A. SELF ROM CHECK

The memories are automatically self checked whenever power is applied. To enter the test moce, hold the test switch on when the power is turned on until PICTURE 0 is displayed. Press the test switch to continue the display tests or press the one-player Start Button to start the game.

B. PICTURE 0 - CROSS HATCH

Adjust the monitor for a SQUARE PATTERN throughout the display and on the edge of the monitor.
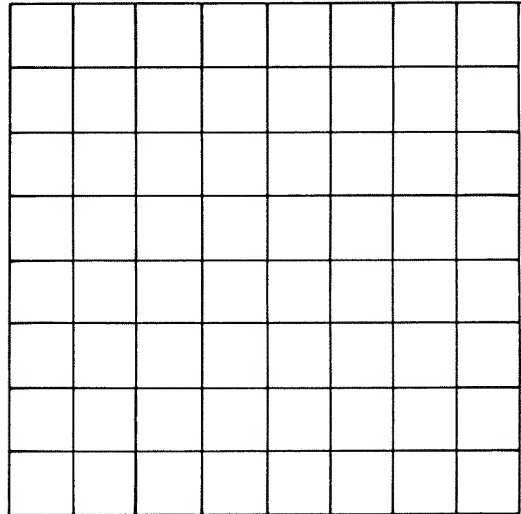
C. PICTURE 1 - COLOR TEST

Assures that the correct colors are properly wired to the monitor.

1 COLOR TEST

RED GREEN BLUE
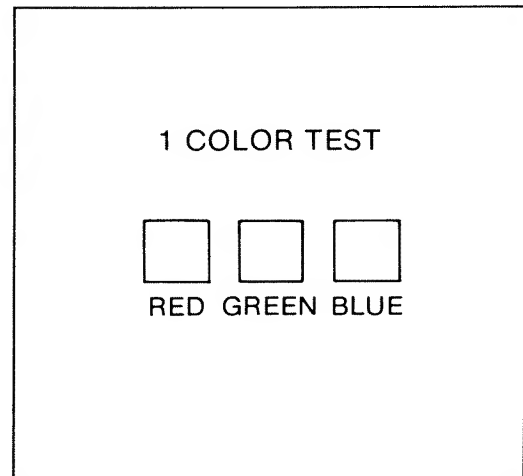
D. PICTURE 2 - CONTROL TEST

As a lever or switch turns on, 0 on the monitor will change to 1. Turning the joystick dial clockwise increments the LEVER DIAL by one. Turning the joystick dial counter-clockwise decrements the LEVER DIAL by one. Insert coin and confirm that the COIN change from a 0 to 1. The service switch can also be checked here.

2 LEVER SWITCH

P1 UP	0	P2 UP	0
P1 DOWN	0	P2 DOWN	0
P1 LEFT	0	P2 LEFT	0
P1 RIGHT	0	P2 RIGHT	0
P1 DIAL	0	P2 DIAL	0
P1 PUSH1	0	P2 PUSH1	0
P1 PUSH2	0	P2 PUSH2	0
COIN	0	COIN2	0

E. PICTURE 3 - MODE CHECK

Set desired mode by setting the DIP
SWITCHES on the PCB. (Refer to the
OPTIONAL SETTINGS.) When the switch
turns on, the number of that BIT will
change from 0 to 1. The actual mode will
also be displayed.

```
            3 MODE

DIP  12345678   DIP  12345678
 1   00100000    2   10101000
DISPLAY        NORMAL
HERO           3
1COIN1 1PLAY    1COIN2 6PLAY
LEVEL          2
DEMO  SOUND  ON
1ST   BONUS   35,000P
2ND   BONUS   70,000P ONLY
CONTINUE
```

F. PICTURE 4 - FONT TEST

Confirm that the Characters are displayed
on the monitor. There are eight different
colors of characters that will be displayed
0 thru 7 automatically.

```
          4 FONT 1


          COLOR 0


       FONT CHARACTER
```
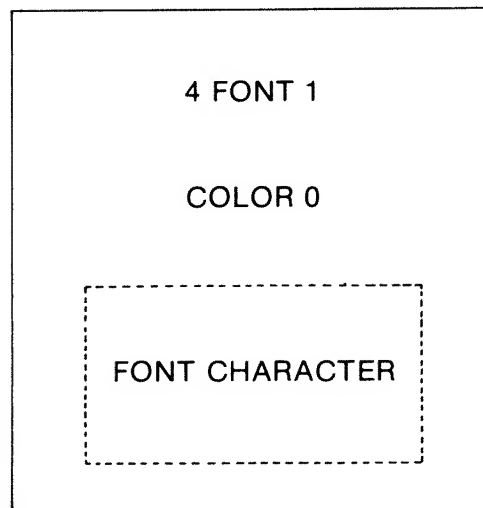
G. PICTURE 5 - SOUND CHECK

Set up the sound Code ("?") to 41-7F, 81-
BF or CO-FF by moving the joystick. The
music, special effects or voice will activate
when you press 2nd Player Control Button
A. If you want to stop the sound, set the
Code to OE and press 2nd Player Control
Button A.

```
      5 SOUND CHECK

   SOUND CODE = ?

     MUSIC  41-7F
     EFFECT 81-BF
     VOICE  CO-FF
     STOP   OE
```

VI. GAME OPERATION

A. HOW TO PLAY

Bermuda Triangle is a 1 or 2 player space-action shooting game. Either player can join in at any stage during play. The game is over when all the PLANES of each player have been destroyed.

The rotary joystick controls PLANES movement and fire direction of the turret. Button A fires missles in the air and bombs the ground simultaneously. Button B selects the formation of the battle guard cruisers.

Pick up E for added power and energy. Depending on the level of energy you may obtain added fire power.

There are six areas to play. You will reach the enemies base at the end of each area automatically. You must destroy the enemies base the moment the middle turret opens to fire to move on to the next area.

When full power is obtained and with three battle guard cruisers positioned up in front in the triangle formation, all enemies may be elliminated by firing one shot.

GOOD LUCK, you are now ready to launch!

B. GAME STYLE

1. STANDARD PLAY

   2-Players can play simultaneously or either player can join at any stage during play. The game will continue until all PLANES of both players are destroyed.

2. COIN-UP CONTINUE

   In addition to standard play you may receive additional PLANES by inserting up to 10 coins and depressing 1 or 2 player start controls.

VII. OPTIONAL SETTINGS

DIP SW NO. 1

ITEM	SPECIFICATION	1	2	3	4	5	6	7	8
GAME STYLE	STANDARD	OFF							
	COIN UP CONTINUE	**ON**							
DISPLAY	NORMAL PICTURE		OFF						
	INVERSE PICTURE		ON						
BONUS	*EVERY BONUS			OFF					
	**LIMITED BONUS			**ON**					
NUMBER OF HERO	3				**OFF**				
	5				ON				
COIN 1	1 COIN 1 PLAY					**OFF**	**OFF**		
	2 COIN 1 PLAY					ON	OFF		
	3 COIN 1 PLAY					OFF	ON		
	4 COIN 1 PLAY					ON	ON		

*Every Bonus ..... Credit one ship (HERO) every 2nd bonus
**Limited Bonus ..... Credit one ship (HERO) at 1st and 2nd bonus only.
No further heros awarded.

DIP SW NO. 2

ITEM	SPECIFICATION	1	2	3	4	5	6	7	8
LEVEL OF DIFFICULTY	EASY	**OFF**	**OFF**	LEVEL 1					
	NORMAL	ON	OFF	LEVEL 2					
	HARD	OFF	ON	LEVEL 3					
	DIFFICULT	ON	ON	LEVEL 4					
ATTRACTION SOUND	WITHOUT SOUND			OFF	OFF	DEMO SOUND OFF			
	WITH ATTRACTION SOUND			**ON**	OFF	DEMO SOUND ON			
MONITOR SETTING	STOP VIDEO DISPLAY			ON	ON	STOP			
	CONTINOUS PLAY			OFF	ON	NEVER RESTART			
BONUS POINTS SETTING 1ST/2ND	25,000/50,000					OFF	OFF		
	35,000/70,000					**ON**	**OFF**		
	50,000/100,000					OFF	ON		
	NO BONUS					ON	ON		

NOTE: Bold face suggests factory recommended settings.

VIII. CONTROL WIRING DIAGRAM

IX. MAIN HARNESS CONNECTIONS

CONNECTOR CR7E - 56DA - 3.96E (HIROSE)

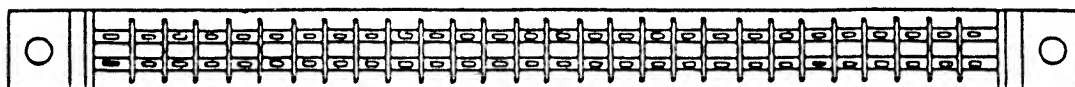(1)   (28)

(A)   (f)

Color Key: Stripe / Background

WIRE COLOR	SOLDER SIDE	PIN NAME	PIN #	PARTS SIDE	WIRE COLOR
BLACK	Ground	A	1	Ground	Black
BLACK	Ground	B	2	Ground	Black
RED	+5VDC	C	3	+5VDC	RED
RED	+5VDC	D	4	+5VDC	RED
GREEN	-5VDC	E	5	-5VDC	GREEN
YELLOW	+12VDC	F	6	+12VDC	YELLOW
		H	7		
		J	8	Coin Counter 1 (-)	BROWN
		K	9		
WHITE	Speaker (-)	L	10	Speaker (+)	WHITE
		M	11		
LIGHT GREEN	Video Green	N	12	Video Red	PINK
GRAY/WHITE	Video Sync	P	13	Video Blue	LIGHT BLUE
VIOLET	Service Switch	R	14	Video Ground	BLACK
GRAY	Tilt or Reset Switch	S	15	Test Switch	ORANGE
		T	16	Coin Switch 1	VIOLET/WHITE
WHITE/BLACK	Start Switch 2	U	17	Start Switch 1	BLACK/WHITE
BROWN/BLACK	2P Control 1 UP	V	18	1P Control 1 UP	BROWN/WHITE
RED/BLACK	2P Control 2 DOWN	W	19	1P Control 2 DOWN	RED/WHITE
ORANGE/BLACK	2P Control 3 RIGHT	X	20	1P Control 3 RIGHT	ORANGE/WHITE
YELLOW/BLACK	2P Control 4 LEFT	Y	21	1P Control 4 LEFT	YELLOW/WHITE
GREEN/BLACK	2P Control 5 PUSH 1	Z	22	1P Control 5 PUSH 1	WHITE/GREEN
BLUE/BLACK	2P Control 6 PUSH 2	a	23	1P Control 6 PUSH 2	WHITE/BLUE
		b	24		
		c	25		
		d	26		
BLACK	Ground	e	27	Ground	BLACK
BLACK	Ground	f	28	Ground	BLACK